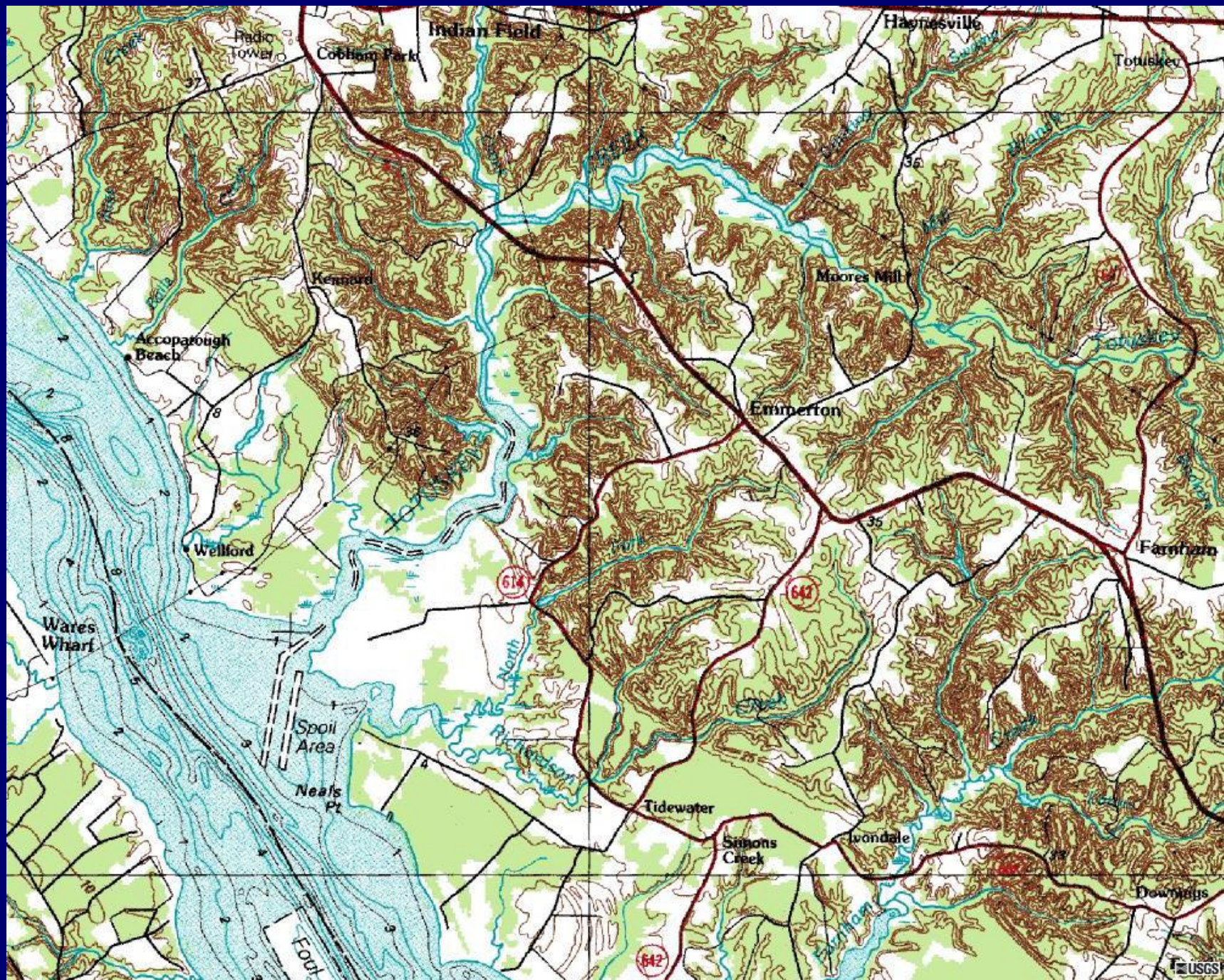


Totuskey and Richardson Creeks

First Shellfish TMDL Public Meetings

May 6, 2009
Warsaw, VA





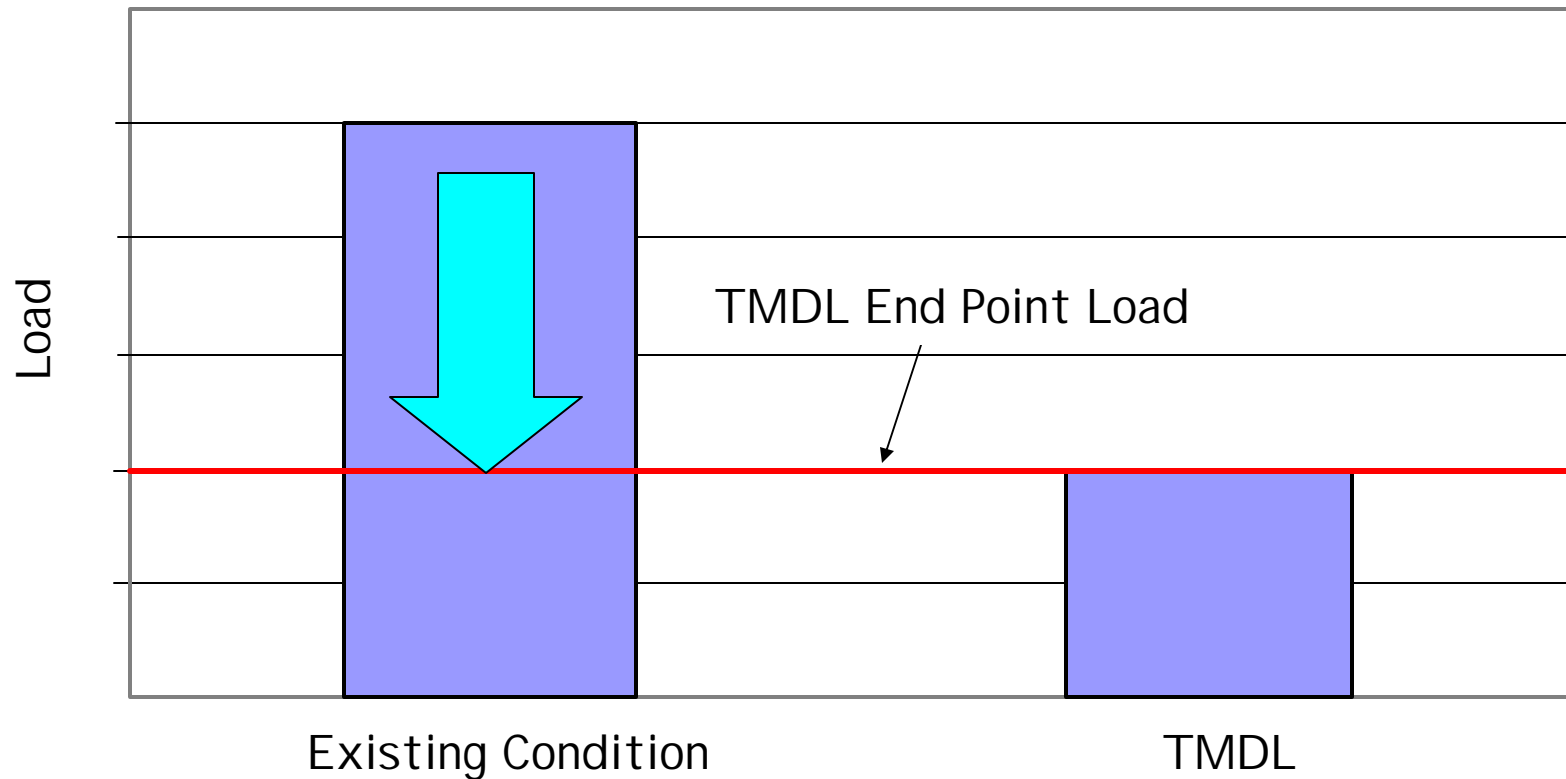
What is a TMDL?

TMDL = Total Maximum Daily Load =
maximum amount of a pollutant that a
waterbody can contain without violating
water quality standards (WQS)



WQS = numeric or narrative limits on
pollutants that ensure the protection of
human health and of aquatic life

An Example TMDL



Reducing existing bacteria load to the TMDL end point load is expected to restore water quality.

Why are TMDL studies necessary?

- ❑ TMDLs must be developed for water bodies that do not meet water quality standards (impaired waters).
- ❑ Impaired waters occur throughout Virginia in lakes, streams, and tidal waters.
- ❑ In Virginia, TMDLs for 210± impaired waters must be developed by 2010.
 - Of these, 25± are shellfish TMDLs under a consent order.
 - ± 1700 TMDLs to be completed by 2022 (as of 2008 DEQ Integrated Assessment Report)

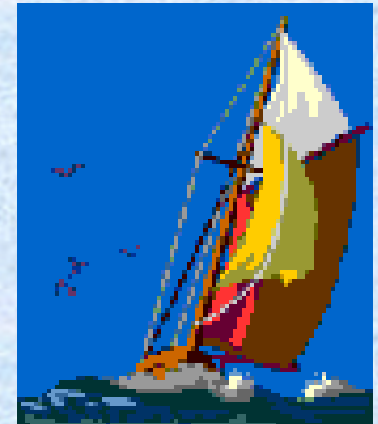
What information is used to develop a TMDL?

- ❑ VDH Sanitary Shoreline Survey
- ❑ VDH Bacteria monitoring data
- ❑ Population estimates for humans, pets, wildlife, livestock (Census, VIMS, DCR, DGIF, & the public)
- ❑ Affected waters volume
- ❑ Bacterial Source Tracking Data (BST)
- ❑ Land Use, Climate, Tide, etc.
- ❑ DEQ permit data
- ❑ DEQ spill response and remediation data

Virginia's TMDL Development Process

- ☑ Public notice for TMDL development
- ☑ TMDL study
- ☑ **Public notice for Draft TMDL**
- ☐ Final TMDL report
- ☐ EPA approval
- ☐ Implementation process

= = > * * **Many opportunities for public
input and participation!** * *



People involved in the Process:

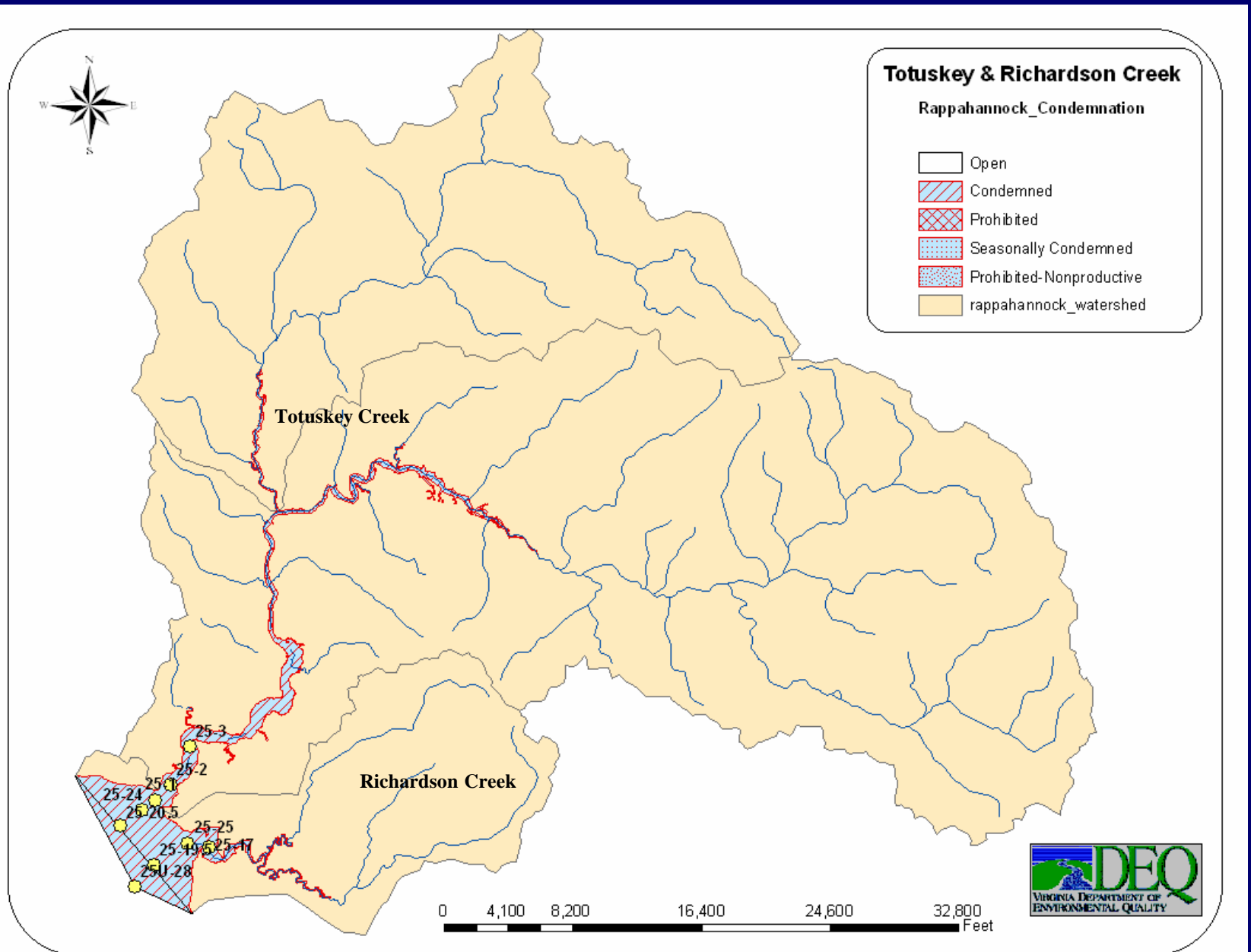
- ❑ Virginia Department of Health - Division of Shellfish Sanitation
- ❑ Virginia Department of Conservation and Recreation
- ❑ Virginia Department of Environmental Quality
- ❑ Other State Agencies, Local Governments and Planning Districts
- ❑ U.S. Environmental Protection Agency and other appropriate federal agencies
- ❑ Citizens groups, educational institutions environmental groups, & local business
- ❑ **YOU!**



Why is a TMDL needed for the Totuskey Creek and Richardson Creek Watersheds?

- ❑ VDH Division of Shellfish Sanitation (DSS) monitors fecal coliform levels in shellfish waters
- ❑ Applicable water quality standards
 - ❑ 30-month geometric mean not exceeding 14 MPN/100 mL
 - ❑ and a 90th percentile not exceeding 49 MPN/100 mL
- ❑ The portions of Totuskey Creek and Richardson Creek that currently fail these standards are:

Totuskey Creek and Richardson Creek Condemnation Map





Totuskey Creek

• Totuskey_Stations

— Totuskey_Streams

Totuskey_condemnation

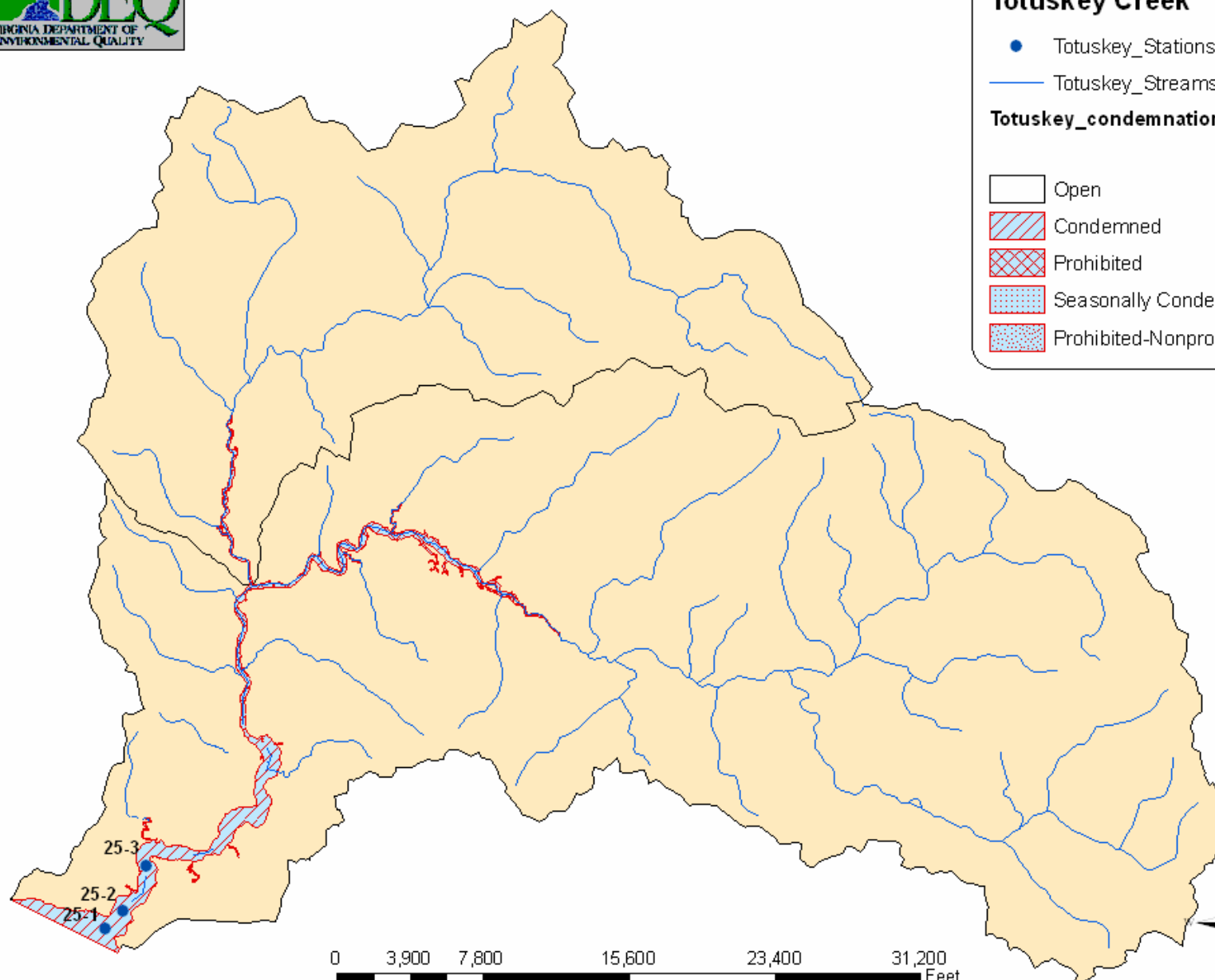
□ Open

▨ Condemned

▩ Prohibited

▤ Seasonally Condemned

▥ Prohibited-Nonproductive



Richardson Creek

● Richardson_Stations

— Richardson_Streams

Richardson_Condemnation

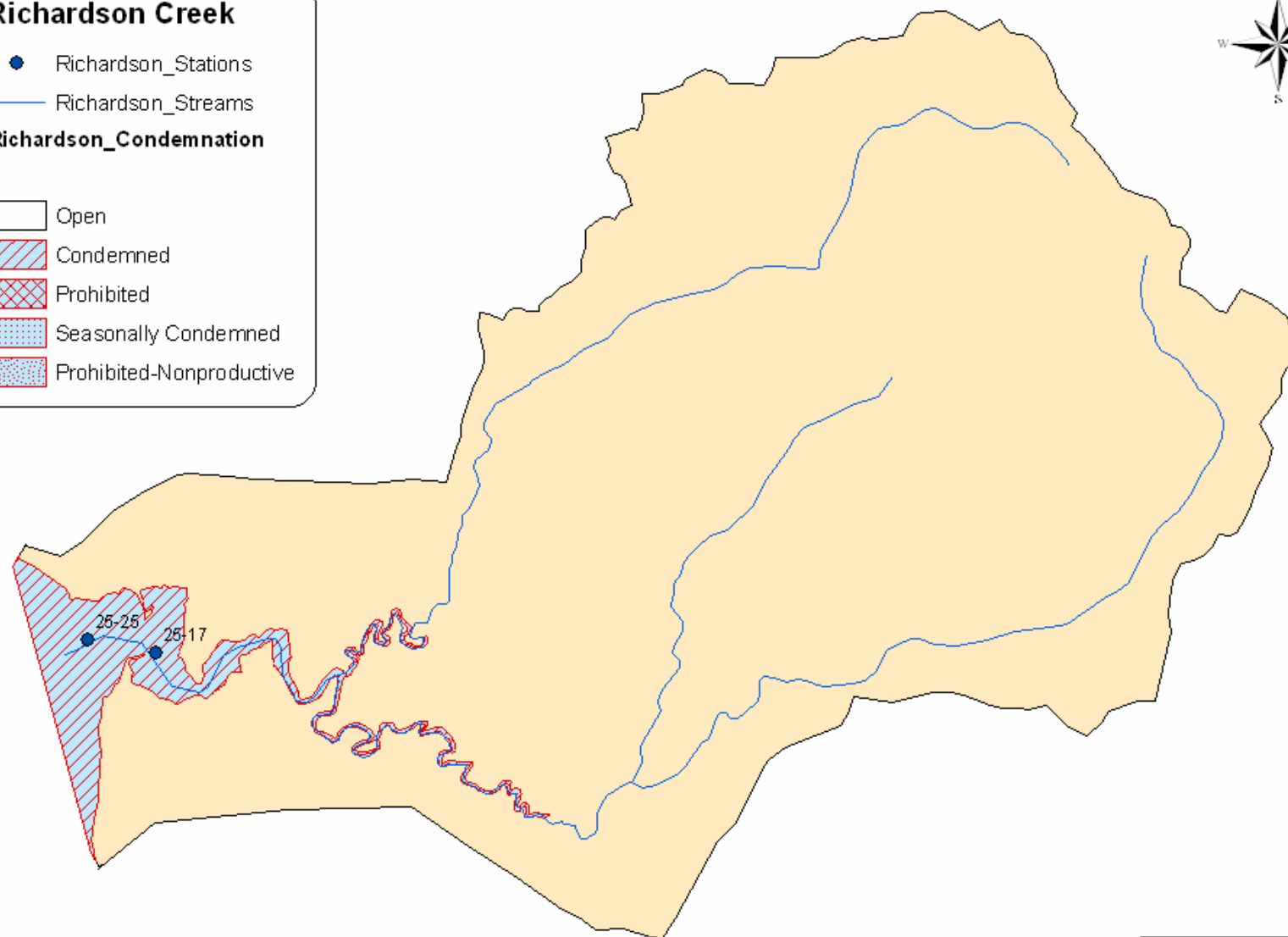
□ Open

▨ Condemned

▩ Prohibited

▤ Seasonally Condemned

▥ Prohibited-Nonproductive



0 1,500 3,000 6,000 9,000 12,000 Feet

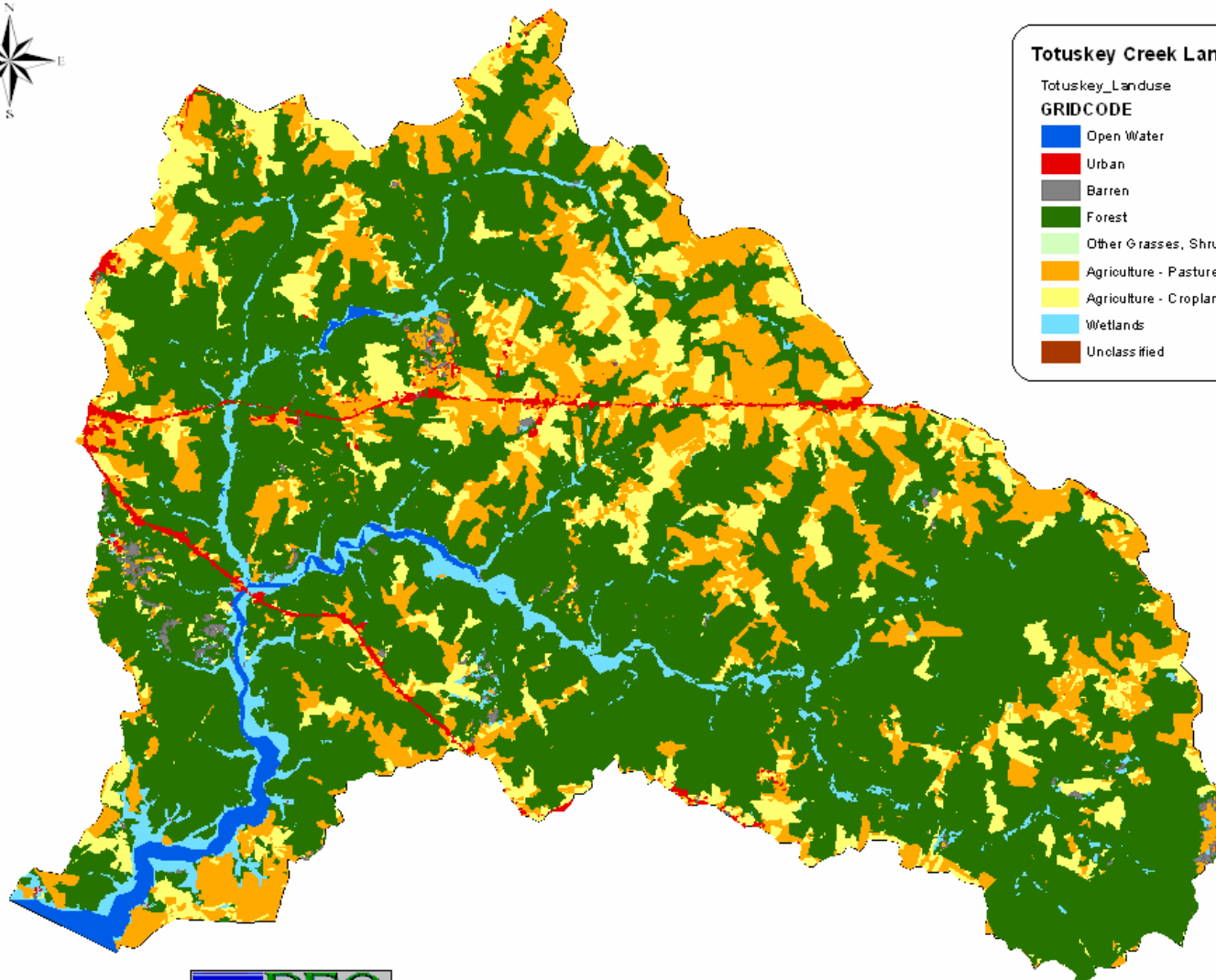


Water Quality Data Summary for Totuskey Creek and Richardson Creek

90th Percentile represents the more stringent reduction

Creek Name	Station	Total Observations (1/month)	Geometric Mean	Station Violates Geometric Standard: 14 MPN	90 th Percentile	Station Violates 90 th Percentile Standard:49 MPN
Totuskey Creek	25-1	260	10.63	No	88.60	Yes
	25-2	262	14.26	Yes	153.70	Yes
	25-3	262	23.94	Yes	324.26	Yes
	25-20_5	31	4.79	No	23.31	No
	25-24	261	10.90	No	67.82	Yes
Richardson Creek	25-17	247	20.68	Yes	172.12	Yes
	25-19_5	31	5.58	No	34.44	No
	25-25	260	9.98	No	91.99	Yes

Land Use in Totuskey Creek



Totuskey Creek Landuse

Totuskey_Landuse

GRIDCODE

- Open Water
- Urban
- Barren
- Forest
- Other Grasses, Shrubland
- Agriculture - Pasture
- Agriculture - Cropland
- Wetlands
- Unclassified



0 4,200 8,400 16,800 25,200 33,600 Feet

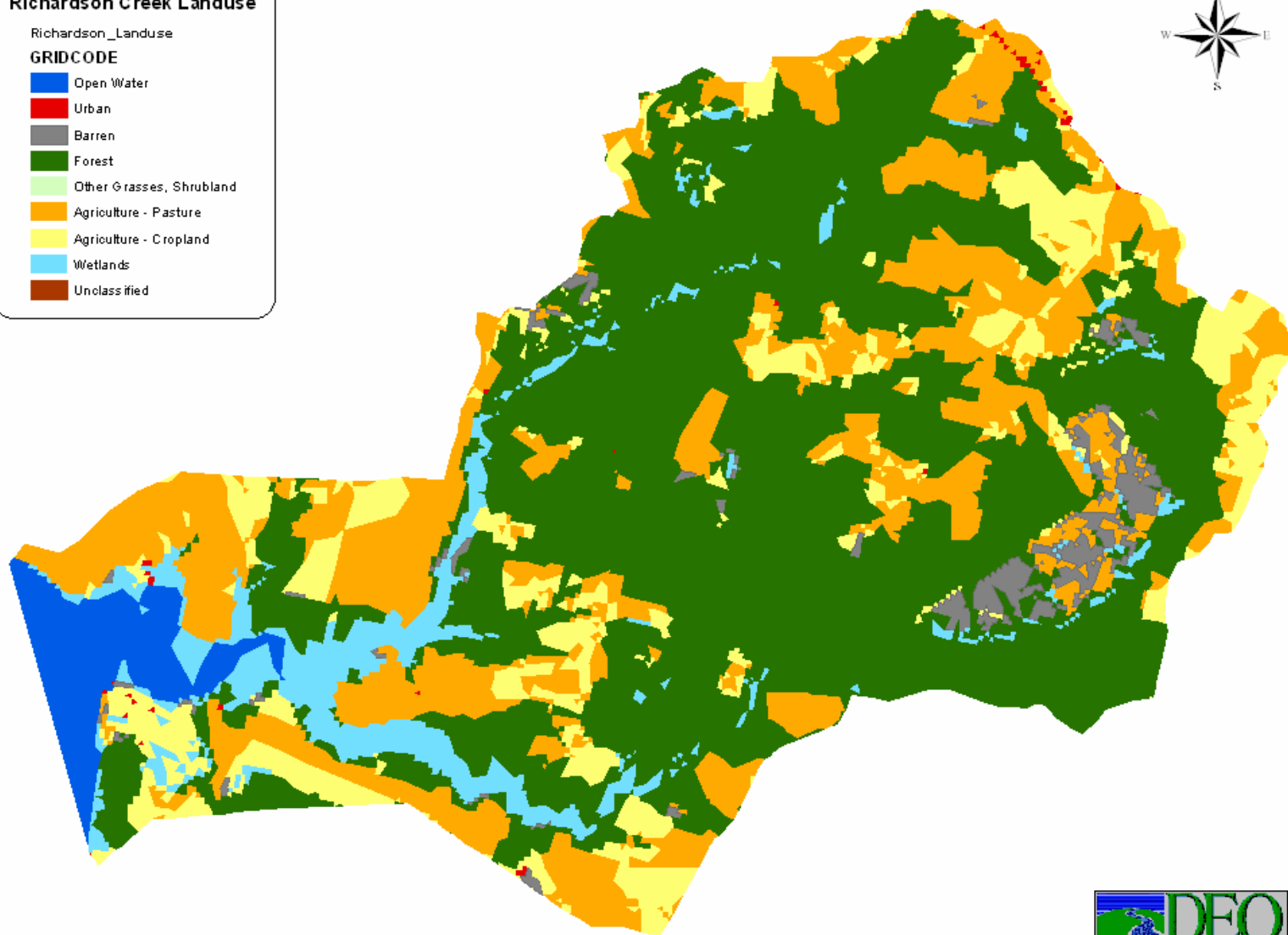
Land Use in Richardson Creek

Richardson Creek Landuse

Richardson_Landuse

GRIDCODE

-  Open Water
-  Urban
-  Barren
-  Forest
-  Other Grasses, Shrubland
-  Agriculture - Pasture
-  Agriculture - Cropland
-  Wetlands
-  Unclassified

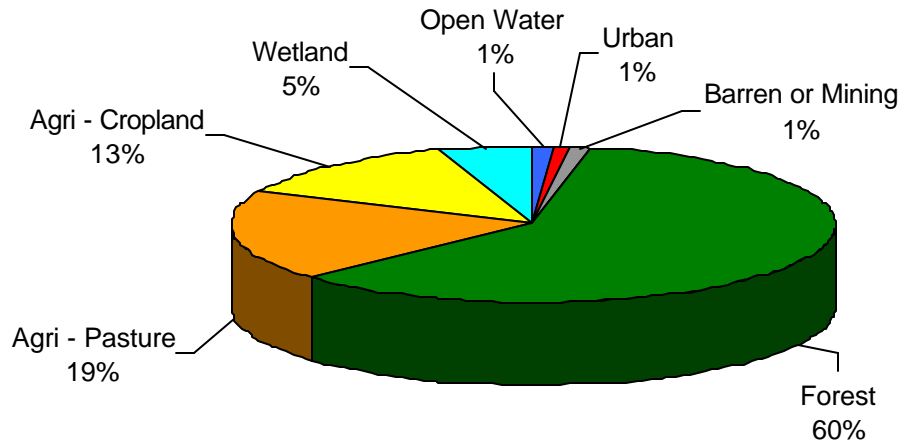


0 1,500 3,000 6,000 9,000 12,000 Feet

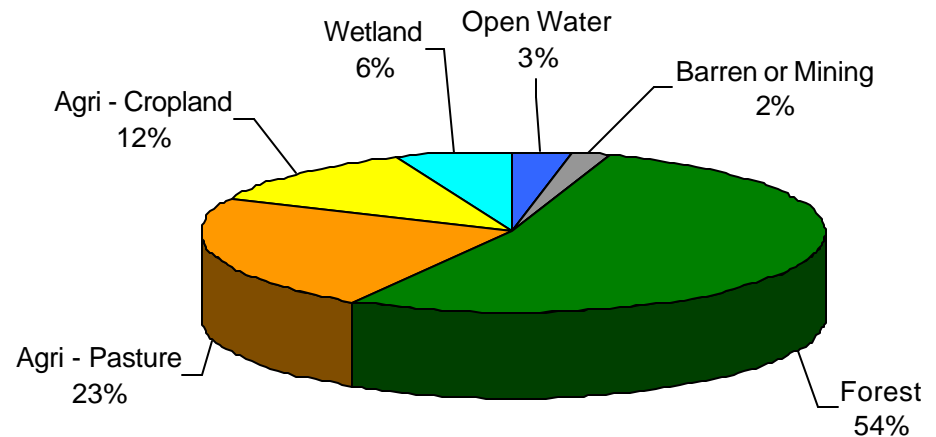


Land Use Percentages by Watershed

Totuskey Creek Land Use Percentages by Type



Richardson Creek Land Use Percentages by Type



Tidal Volumetric Model + BST TMDL Approach

- ❑ Calculate volume of impaired water
- ❑ Calculate the acceptable loading;

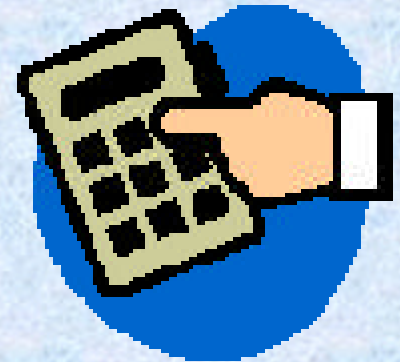
Water Quality Standard (WQS) x Volume

- ❑ Calculate actual loading;

Critical fecal count x Volume

- ❑ Source determination;

Fecal samples collected for BST are subjected to Antibiotic Resistance Analysis (ARA) and compared with known fecal samples



Use of Bacterial Source Tracking in TMDLs

- ❑ VDH-DSS monitoring data is used to calculate critical fecal count
- ❑ Supplementary BST samples at selected stations are used to help identify bacteria sources
- ❑ Antibiotic Resistance Analysis - BST method for source load allocation into 4 categories:

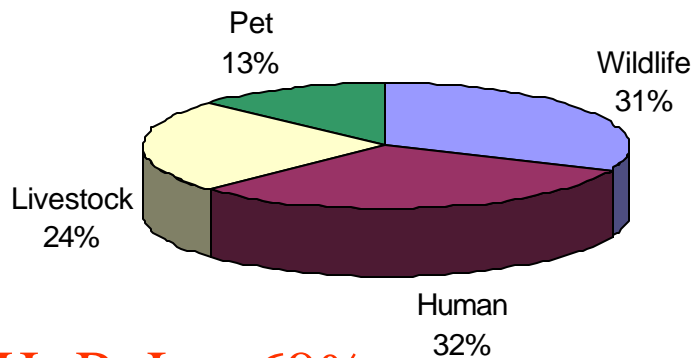


- 1. Human**
- 2. Pets**
- 3. Livestock**
- 4. Wildlife**

Weighted Totuskey and Richardson Creeks

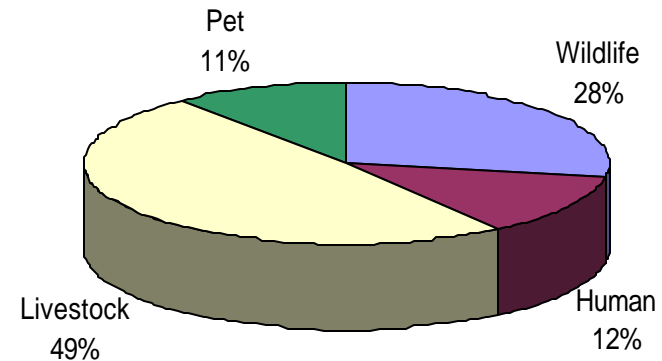
BST Sources

**Richardson Creek BST Percentages
(Isolate, Concentration, and Volume Weighted)**



H+P+L = 69%

**Totuskey Creek BST Percentages
(Isolate, Concentration, and Volume Weighted)**



H+P+L = 72%

Population Estimates

***Domestic Animals
and Septic Systems
observed contributing
pollution to
Totuskey Creek &
Richardson Creek
(As cited in VDH Sanitary
Survey 2005 and visual
observations from DEQ staff
2009)***

[illegible]

Fecal Coliform Sources	Totuskey Creek & Richardson Creek
Treatment facilities (human)	3
Septic (human)	3
Cattle	309
Dogs	40
Horses	13
Donkey	2
Goats	28
Chicken	20
Sheep	2
Goose	1
Peacock	1
llama	1

Livestock and Wildlife Population Estimates for Collective Watersheds

From calculations based on land area per species – data from DGIF

	Cattle	Chickens	Horses	Dogs	Deer	Raccoons	Ducks	Geese
Totuskey Creek	454	4	8	628	1198	1888	791	589
Richardson Creek	59	0	1	85	174	262	291	217
Total for Collective Watershed	513	4	9	713	1372	2150	1082	806

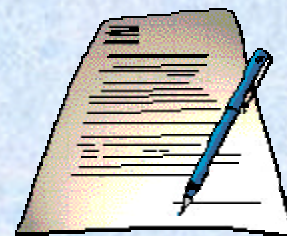
Next Steps...

- **30 Day Public Comment Period**

Ends June 5, 2009

***Comments must include the name, address, and telephone number of the commenter.

All comments will receive a written response and will be incorporated into the final report that will be sent to EPA.***



- **TMDL Development Continues...**
- **Final Public Meetings**
- **Final 30 Day Public Comment Period**
- **Report Submitted to EPA for approval**
- **Implementation Planning**

Questions?? Comments??

**Please send written comments or
questions to:**

DEQ - Piedmont Regional Office

Attn: Margaret Smigo

4949-A Cox Road

Glen Allen, VA 23060

Email: mjsmigo@deq.virginia.gov

Presentation is available at:

<http://www.deq.virginia.gov/tmdl/mtgppt.html>

TMDL Website: <http://www.deq.virginia.gov/tmdl>

